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ASP-ARM Science Plan

FY 2009 ASP Science Team Meeting
February 25-27, 2009
Santa Fe, NM

Ashley D. Williamson
ASP Program Manager
Climate & Environmental Research Division
Biological & Environmental Research
Office of Science
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Background

- CCRP Strategic Plan – presents coherent division strategy for all DOE/BER climate programs
- Time ripe for an updated science plan –
  - ARM science plan last updated in 2004
  - ASP operating on BERAC reconfiguration report as *de facto* plan
  - While neither plan is obsolete, neither completely reflects current scientific or public environment
- Desire to show complementary missions of ARM and ASP
- Need to address strategy for overlapping missions of ARM and ASP (especially aerosol indirect effects)
- Science Plan to address interfaces with Climate Modeling

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Timeline

- Info requests to programs in Nov-Dec. 2008
- ARM was in progress and addressed science questions in November WG meetings
- Charge questions to ASP PI's in December
- Preliminary responses in hand – need to update and get feedback here
- Writing team will assemble and integrate with ARM material during March – April
- Draft due for review April 30
- Target final delivery date June 2009

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December Charge Introduction

The objective of ASP, since the reconfiguration of the program that took place in 2004, is "to provide and improve the scientific knowledge needed to simulate and predict radiative forcing by aerosols and their effects on climate". Following this reconfiguration ASP has given major attention to the reduction of scientific uncertainties in two specific areas that were identified by the BERAC advisory panel in 2003 as especially requiring attention. These are (1) the indirect effects of aerosols on clouds and (2) the role of black carbon and organic aerosols on climate. Within this context:

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December Charge Questions

- *Do the specific gap areas described above still represent the priority science questions in aerosol forcing facing the climate community?*
- *If not, what are the outstanding knowledge gaps needed to calculate current direct and indirect aerosol radiative forcing and to project these forcings into the future? What specific science questions must be answered?*
- *Which of these scientific questions can be meaningfully addressed by ASP science in the next five years? What approaches are required to make the needed scientific advances?*
- *How can ASP be more effective in improving parameterizations or representations of priority aerosol processes in global climate models?*
- *How can ASP science be more effective in addressing the outstanding science questions identified in assessments by organizations such as the Intergovernmental Panel on Climate Change and the National Academy of Sciences?*
- *What other gaps in research do you identify where ASP could make a significant difference?*

Some patterns from responses -1

- Eight responses from PIs or groups
- All agreed the two "gap areas" were critical, and suggested several questions and activities relevant to them
- Some felt that the two areas needed expanding – adding an area on Aerosol Life Cycle issues and renaming the indirect effects area as Aerosol-Cloud Interactions; we have done this.
- Number of comments SOA>BC>aerosol-cloud
- Robust number of comments on optical properties and CCN activity of all aerosol types of program interest
- Suggestions spanned lab/field/modeling/instrument spectrum

Some patterns from responses - 2

- Other topics:
  - Biomass burning aerosols and emissions
  - Ice nucleation
  - Aerosol lifetimes and removal processes
  - Modern vs. fossil carbon dating
  - Properties of multiphase aerosols
  - Nitrates
  - Seasonal effects (mainly on SOA)
- Comments are available if desired (22 p total, 8 page summary)

Some problems came up in responses

- Several short answers, some didn't think general topics specific enough, some didn't know what we wanted
- Several comments were "programmatic process-oriented" – not science plan material but some interesting and potentially useful: e.g., ideas for communication with modelers, ASP reports
- Many didn't send back anything
- Some questions (e.g. re: IPCC/NAS) a bust
- I suspected the charge wasn't well posed and should be refocused for this meeting

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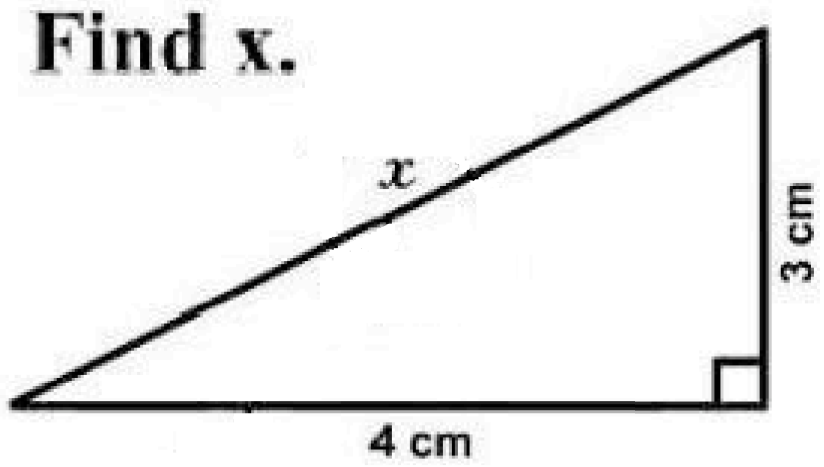
A simplified question set may be better

Sometimes the answer you get depends on how you ask the question.



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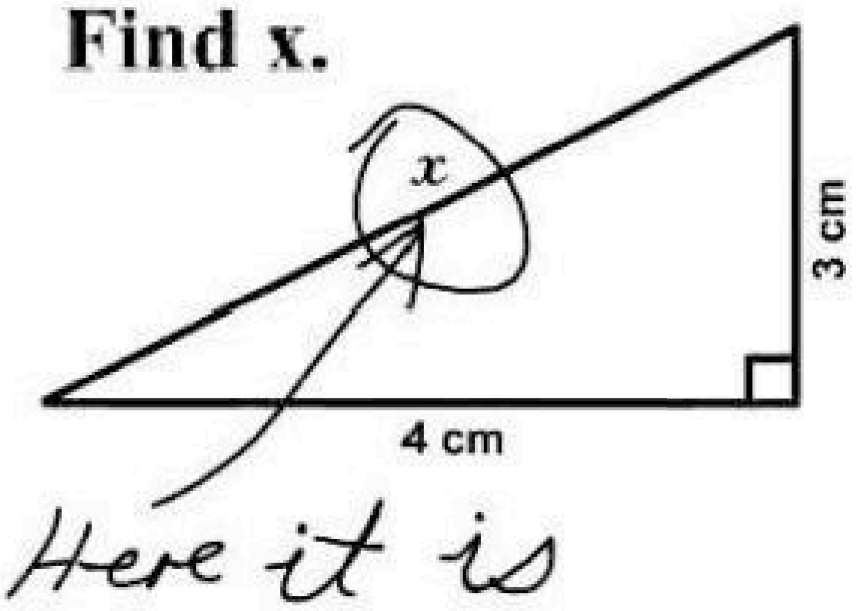

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Remap of Theme topics

(1) the indirect effects of aerosols on clouds and
(2) the role of black carbon and organic aerosols on climate

=====>>> led to some overlap and omissions

We want to organize our thoughts on the categories below:

Aerosol Life Cycle

Aerosol Direct Effects

Cloud – Aerosol Interactions

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Breakout Questions

- *What are the most significant or important science questions that should drive ASP research in the next 5-10 years? What specific knowledge gaps must be filled?*

Wed. Groups

- *What approaches are required by ASP science in the next five years to make the needed scientific advances?*
- *How can ASP be more effective in improving parameterizations or representations of priority aerosol processes in global climate models?*
- *(If applicable to topic) how can ASP and ARM Science coordinate efforts to address this area?*

Thurs. Groups